

A New Cone Shell (Conidae) from the South China Sea

Edward J. Petuch¹ and David P. Berschauer²

¹ Department of Geosciences, Florida Atlantic University, Boca Raton, Florida 33431

epetuch@fau.edu

² 25461 Barents Street, Laguna Hills, California 92653

shellcollection@hotmail.com

ABSTRACT A new species of the biconic, deep water conid genus *Turriconus* Shikama and Habe, 1968 has been discovered in the bathyal zones south of the Pratas Islands, South China Sea. This new taxon, *Turriconus takahashii* new species, superficially resembles *T. excelsus* (Sowerby III, 1908), both in size and shape and is one of the largest species in the genus *Turriconus*.

KEY WORDS Cone Shells, Conidae, *Turriconus*, *T. takahashii*, Pratas Islands, South China Sea

INTRODUCTION

The genus *Turriconus* is a distinctive group of biconic-shaped deep water cone shells with a wide range across deep neritic and bathyal areas of the Indian and Western Pacific Oceans. Although only 12 species are presently known (listed in the Discussion), many more undescribed *Turriconus* species are undoubtedly present in deeper water areas along Western Australia, the Indian Ocean, and the South China Sea off the coasts of China and Vietnam. Recently, a well-known shell dealer and diver from Hawaii, Christopher Takahashi, brought to our attention a very large *Turriconus* species that had been trawled off the Pratas Islands in the South China Sea. A review of the *Turriconus* literature (Biggs *et al.*, 2010, and Monnier *et al.*, 2018) showed that it represented an undescribed taxon and this newest member of the genus is described in the following sections. The holotype of the new species is deposited in the type collection of the Department of Malacology, Los Angeles County Museum of Natural History, Los Angeles, California and bears an LACM catalog number.

SYSTEMATICS

Class Gastropods
Subclass Sorbeoconcha
Order Prosobranchia
Infraorder Neogastropoda
Superfamily Conoidea
Family Conidae
Subfamily Coninae
Genus *Turriconus* Shikama and Habe, 1968

Turriconus takahashii Petuch and
Berschauer, new species
(Figure 1A-D)

Description. Shell large for genus, averaging 56 mm, elongated, distinctly biconic, with spire almost same size as body whorl; shoulder sharply-angled, bordered by large rounded carina; spire whorls very sloping, slightly indented, with carinae of previous whorls projecting above suture, producing distinctly scalariform structure; body whorl smooth and shiny, sculpted with 23-25 shallowly impressed spiral grooves; spiral grooves become finer and more numerous toward anterior end; body whorl dark tan or golden brown, with 2 wide white bands, one anterior of mid-body line and one

around anterior end; white bands marked with rows of small, dark rectangular brown checkers, often aligned as broken longitudinal flammules; wide brown bands marked with scattered large, white, longitudinal flammules, often arranged in zig-zag pattern; spire whorls dark brown, marked with scattered, irregular, large white flammules; edge of shoulder carina and spire whorl carinae marked with small white irregular patches, producing checkered pattern; aperture of uniform width throughout, proportionally very narrow; interior of aperture white; protoconch composed of 2 rounded whorls, proportionally small, pale tan in color.

Type Material. **HOLOTYPE** - LACM No. 3652. Length 56.4 mm, width 20.9 mm, 250 m depth off the Pratas Islands, Taiwan (Figure 1A & B); **OTHER MATERIAL EXAMINED** - length 56.1 mm, from the same locality and depth as the holotype, in the research collection of the senior author (Figure 1C); length 57.3 mm, from the same locality and depth as the holotype, in the research collection of the junior author (not illustrated); and length 46.5 mm, allegedly trawled at 180 m depth in the East China Sea, in the research collection of the junior author (Figure 1D).

Type Locality. The holotype of *Turriconus takahashii* was trawled by Taiwanese fishermen from 250 m depth south of the Pratas Islands, Taiwan, northern South China Sea.

Distribution. Known only from 250 m depth in the northern South China Sea, near the Pratas Islands, Taiwan. The species appears to also be present in the central basin of the South China Sea.

Ecology. The new cone was collected along with abundant pleurotomariid gastropods, especially *Mikadotrochus hirasei* and *Bayerotrochus teramachii* (Takahashi, personal

communication). These were trawled on an open sponge-covered sea floor along with *Turriconus takahashii*.

Etymology. The new cone shell is named for Christopher Takahashi of Kapolei, Oahu Island, Hawaii, who purchased the type lot from Taiwanese fishermen and who first recognized that the shells could represent a new species.

Discussion. Of the known *Turriconus* species from Japan, the Philippines, and the South China Sea, *T. takahashii* is most similar to the recently-described *T. rizali* (Biggs, Watkins, Corneli, and Olivera, 2010) from deep water off the Philippines (Figure 1E & F). This new South China Sea cone differs from its Philippine congener in being a larger and proportionally more elongated shell with a higher spire and in having a much more elongated body whorl that is less turnip-shaped. With its elongated biconic form and large shell size, *T. takahashii* is also very similar to *T. excelsus* (Sowerby III, 1908) from Japan, the Philippines, and Melanesia (Figure 1G & H), but differs in having coarser and stronger body whorl grooves, in lacking the network of fine dark brown longitudinal flammules around the shoulder and mid-body, and in having less-developed scalariformation on the spire whorls.

The new South China Sea cone is also very similar to the Pliocene fossil *T. gratacapi* (Pilsbry, 1904) from the Kikai Formation of Kikaijima Island, Kagoshima Prefecture, Japan (illustrated in the taxonomic lists produced by R.M. Filmer, under the “Cone Collector” online magazine; 2012). Although closely resembling *T. takahashii*, this extinct Pliocene species is a smaller shell with much more sloping spire whorls, has a smaller and thinner shoulder carina, and lacks the distinct stepped (scalariform) structure seen on the new South China Sea species. Based on its shell

morphology, *T. gratacapi* appears to be the direct ancestor of *T. takahashii* and may represent the late Neogene stem stock for the entire late Pleistocene-Holocene *Turriconus* radiation of Japan and the Western Pacific region.

The genus *Turriconus* is now known to contain 12 species which are distributed throughout the Indo-Pacific Region from East Africa to Melanesia and Japan (Biggs *et al.*, 2010, and Monnier *et al.*, 2018). The largest number of *Turriconus* species occurs in the Philippines and Japan, which probably represents the center of evolution for the genus. These include:

Turriconus acutangulus (Lamarck, 1810) (Indo-West Pacific; the shallowest-dwelling species)

Turriconus aequiquadratus (Monnier, Tenorio, Bouchet, and Puillandre, 2018) (Madagascar)

Turriconus andremenezi (Olivera and Biggs, 2010) (Philippines)

Turriconus beatrix (Tenorio, Poppe, and Tagaro, 2007) (Philippines)

Turriconus bicolor (Sowerby I, 1833) (Philippines and Japan)

Turriconus excelsus (Sowerby III, 1908) (Western Pacific)

Turriconus miniexcelsus (Olivera and Biggs, 2010) (Western Pacific)

Turriconus praecellens (Adams and Adams, 1854) (Western Pacific)

Turriconus rizali (Biggs, Watkins, Corneli, and Olivera, 2010) (Philippines)

Turriconus subaequalis (Sowerby III, 1870) (Philippines)

Turriconus takahashii Petuch and Berschauer, new species (South China Sea)

Turriconus wilmeri (Sowerby III, 1882) (Andaman Sea and Bay of Bengal)

The evolutionary relationships and venom production of *T. acutangulus*, *T. andremenezi*, *T. excelsus*, *T. praecellens*, and *T. miniexcelsus* were recently published by Qing *et al.*, 2017.

ACKNOWLEDGMENTS

We thank Christopher Takahashi of Kapolei, Oahu Island, Hawaii for the generous donation of specimens of the new species for our research.

REFERENCES

- Biggs, J.S., M. Watkins, P. Showers Corneli, and B.M. Olivera. 2010. Defining a clade by morphological, molecular, and toxinological criteria: distinctive forms related to *Conus praecellens* A. Adams, 1854 (Gastropoda: Conidae). *The Nautilus* 124(1):1-19.
- Filmer, R.M. 2012. Filmer website in The Cone Collector online newsletter and checklists; at www.theconecollector.com
- Monnier, E., M.J. Tenorio, P. Bouchet, and N. Puillandre. 2018. The cones (Gastropoda) from Madagascar "Deep South": composition, endemism and new taxa. *Xeonphora Taxonomy* 19:25-75.
- Qing, L., N. Barghi, A. Lu, A.E. Fedosov, B.K. Pradip, A.O. Lluisma, G.P. Concepcion, M. Yandell, B.M. Olivera, and H. Safavi-Hemami. 2017. Divergence of the Venom Exogene Repertoire in Two Sister Species of *Turriconus*. *Genome Biology and Evolution* 9(9):2211-2225.



Figure 1. Species of *Turriconus* from the South China Sea and Philippines. A, B = *Turriconus takahashii* Petuch and Berschauer, new species; holotype, length 56.4 mm, trawled by Taiwanese fishermen from 250 m depth south of the Pratas Islands, Taiwan, South China Sea. C = *Turriconus takahashii* Petuch and Berschauer, new species, length 56.1 mm, trawled from 250 m depth off the Pratas Islands (Petuch collection); D = *Turriconus takahashii* Petuch and Berschauer, new species, length 46.5 mm, allegedly trawled from 180 m depth in the East China Sea (Berschauer collection); E, F = *Turriconus rizali* (Biggs, Watkins, Corneli, and Olivera, 2010), length 24 mm, 150 m depth off Olango Island, Philippines (Berschauer collection). G, H = *Turriconus excelsus* (Sowerby III, 1908), length 70.7 mm, 200 m depth off Bohol Island, Philippines (Berschauer collection).